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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FULLER, ERIC B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 10.03.2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/905,320

Applicant(s)

BASCERI ET AL.

Examiner

Eric B Fuller

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 17-22 and 52-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 17-22 and 52-66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7, 15
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

The request filed on August 15, 2002 for Continued Examination (RCE) under 37 CFR 1.114 is acceptable and an RCE has been established. An action on the RCE follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 17-20, 52-57, 60-63 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Somekh et al. (US 6,258,170) in view of Nagasawa et al. (US 6,143,679).

Somekh teaches a process where a BST film is produced by CVD onto a silicon wafer (abstract). The three precursors are supplied to the substrate as a single stream (column 17, lines 40-60) along with a single oxidizer or mixture of oxidizers (column 19, lines 20-30). The oxidizers are inorganic (column 19, line 25). It is taught that the oxidizer flow rate controls the crystalline phase of the deposited film (column 19, lines 30-35). The reference fails to provide motivation to change the oxidation flow rate

(which in turn effects the crystalline phase of the BST film) during deposition of the BST film.

However, Nagasawa teaches a layered film of BST wherein each layer has a crystalline phase that is different from adjacent layers (column 8, lines 13-32). It is also taught that the relative amounts of the metals and oxides differ with each crystalline phase (figure 1; column 7, lines 27-41). This is done because ferroelectricity of BST films depends on the displacement of the metals and oxygen atoms over the crystal (column 7, lines 45-50). It is taught that having some layers being deficient in oxygen improves the ferroelectricity of the BST film (column 7, lines 35-40). One of ordinary skill would recognize that oxygen deficiency is a direct result of the amount of oxygen source being fed. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to change the flow rate of oxidizer such in Somekh such that the different crystalline phases are achieved in a layered fashion. By doing so, ferroelectricity of the BST film is improved, as taught by Nagasawa.

Claims 7, 8, 21, 22, 58, 59, 64, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Somekh et al. (US 6,258,170) in view of Nagasawa et al. (US 6,143,679) as applied to claims 1, 17, 52, and 60 above, and further in view of Kang et al. (US 6,127,218).

Somekh and Nagasawa, as shown above, make obvious the limitations to claims 1, 17, 52, and 60. Somekh teaches the oxidizers may be oxygen and/or N₂O (column

19, lie 25). However, Kawahara fails to teach that the oxidizer may comprise NO or be a mixture of oxides.

Kang teaches that suitable oxidizers for CVD of BST films include mixtures of oxygen in NO. It is also taught that NO is an equivalent substitute for N_2O as an oxidizer for BST films. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize NO and/or oxygen as the oxidizers for the process made obvious by Somekh and Nagasawa. By doing so, one would have a reasonable expectation of achieving similar results since Kang teaches that the oxidizers are equivalent.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Satoh et al. (6,335,302) teaches that it is well known that crystal structure effects relative concentration of metals in dielectric films. Summerfelt (US 5,909,043) teaches that the dielectric constant of BST films critically depends on the oxygen content of the film. Allman (US 6,211,096) teaches that it is desirable to have a dielectric film wherein the dielectric constant carries throughout the thickness of the film. Kawahara et al. (US 5,834,060) is cited as being relevant to the applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (703) 308-6544. The examiner can normally be reached on Mondays through Thursdays.

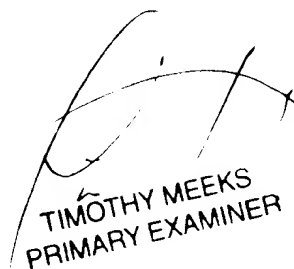
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached at (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



EBF
October 1, 2002



TIMOTHY MEEKS
PRIMARY EXAMINER